



## 299-E28-60 (A6811)

### Log Data Report

#### Borehole Information:

<b>Borehole:</b> 299-E28-60 (A6811)		<b>Site:</b> 216-B-9 Crib			
<b>Coordinates (WA State Plane)</b>		<b>GWL (ft)<sup>1</sup>:</b> Not reached		<b>GWL Date:</b> N/A <sup>2</sup>	
<b>North</b>	<b>East</b>	<b>Drill Date</b>	<b>TOC<sup>3</sup> Elevation</b>	<b>Total Depth (ft)</b>	<b>Type</b>
136,885.8 m	573,882.9 m	July 1948	207.5 m	150	Cable Tool

#### Casing Information:

Casing Type	Stickup (ft)	Outer Diameter (in.)	Inside Diameter (in.)	Thickness (in.)	Top (ft)	Bottom (ft)
Steel Welded	0.8	8.625	8.0	0.3125	0	148

#### Borehole Notes:

The logging engineer measured the stickup using a steel tape. Stickup was measured between an engraved "X" on top of the casing and the ground surface. Calipers were used to measure the casing wall thickness and the outside diameter; the inside diameter is calculated. Zero reference is the top of casing stickup. Top of casing stickup is cut squarely. HWIS<sup>4</sup> is the source of the TOC elevation and coordinates. Total depth (ground level reference) and casing bottom (TOC reference) are reported from information provided in Chamness and Merz (1993). The borehole was swabbed on 03/12/02, and no contamination was detected.

#### Logging Equipment Information:

<b>Logging System:</b>	Gamma 2A	<b>Type:</b>	SGLS (35%)
<b>Calibration Date:</b>	11/01/01	<b>Calibration Reference:</b>	GJO-2002-286-TAR
		<b>Logging Procedure:</b>	MAC-HGLP 1.6.5, Rev. 0

#### Spectral Gamma Logging System (SGLS) Log Run Information:

Log Run	1	2	3	4	
Date	04/02/02	04/03/02	04/04/02	04/04/02	
Logging Engineer	Spatz	Spatz	Spatz	Spatz	
Start Depth (ft)	1.0	147.5	47.0	25.5	
Finish Depth (ft)	27.0	46.0	26.0	10.0	
Count Time (sec)	100	100	100	100	
Live/Real	R	R	R	R	
Shield (Y/N)	N/A	N/A	N/A	N/A	
MSA Interval (ft)	0.5	0.5	0.5	0.5	
ft/min	N/A	N/A	N/A	N/A	
Pre-Verification	BA118CAB	BA119CAB	BA120CAB	BA120CAB	
Start File	BA118000	BA119000	BA120000	BA120043	
Finish File	BA118052	BA119203	BA120042	BA120074	
Post-Verification	BA118CAA	BA119CAA	BA121CAA	BA121CAA	
Depth Return Error (ft)	0	0	N/A	0	

Log Run	1	2	3	4	
Comments	No fine-gain adjustment.	Fine-gain adjustment notes below.	No fine-gain adjustment.	Repeat section. No fine-gain adjustment.	

### **Logging Operation Notes:**

Zero reference is the top of casing. Logging was performed with a centralizer installed on the sonde. Pre- and post-survey verification measurements for the SGLS employed the Amersham KUT verifier with SN 082.

During SGLS logging, fine-gain adjustments were made to maintain the 1460-keV ( $^{40}\text{K}$ ) photopeak at a pre-described channel. During logging run 2, 04/03/02, fine-gain adjustments were made after files BA119096, BA119137, and BA119191.

### **Analysis Notes:**

<b>Analyst:</b>	Sobczyk	<b>Date:</b>	05/01/02	<b>Reference:</b>	MAC-HGLP 1.6.3, Rev. 0
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SGLS pre-run and post-run verification spectra were collected at the beginning and end of each day. The verification spectra were all within the control limits. The recorded peak counts per second (cps) at the 609-keV, 1461-keV, and 2615-keV photopeaks on the post-run verification spectra as compared to the pre-run verification spectra for each day were within 8 percent of one another at each spectrum's energy line. The post-run verification spectra were used to determine the energy and resolution calibration for processing the data using APTEC Supervisor.

Spectra for the SGLS were processed in batch mode using APTEC Supervisor to identify individual energy peaks and determine count rates. Concentrations were calculated in EXCEL (source file: G2ANov1.xls), using parameters determined from analysis of recent calibration data. Zero reference is the top of the casing. The casing configuration was assumed to be one string of 8-in. casing with a thickness of 0.322 in. to a log depth of 152 ft. A casing thickness of 0.322 in. is the published value for ASTM schedule-40 steel pipe (a commonly used casing material at Hanford). This casing thickness is within the range of measurement error associated with the logging engineer's measurements. A water correction was not needed or applied to the SGLS data. Dead time corrections were not needed because dead time did not exceed 10.5 percent.

### **Log Plot Notes:**

Separate log plots are provided for gross gamma and dead time, naturally occurring radionuclides ( $^{40}\text{K}$ ,  $^{238}\text{U}$ , and  $^{232}\text{Th}$ ), and man-made radionuclides. For the naturally occurring radionuclides, plots of the repeat logs versus the original logs are included. For each radionuclide, the energy value of the spectral peak used for quantification is indicated. Unless otherwise noted, all radionuclides are plotted in picocuries per gram (pCi/g). The open circles indicate the minimum detectable level (MDL) for each radionuclide. Error bars on each plot represent error associated with counting statistics only and do not include errors associated with the inverse efficiency function, dead time correction, or casing correction. These errors are discussed in the calibration report. A combination plot is also included to facilitate correlation.

### **Results and Interpretations:**

$^{137}\text{Cs}$  was the only man-made radionuclide detected in this borehole.  $^{137}\text{Cs}$  was detected near the ground surface (1.0- through 4.5-ft log depth) at activities ranging from 0.2 to 0.7 pCi/g.  $^{137}\text{Cs}$  was also detected at 110 ft with an activity of about 0.2 pCi/g at its MDL (0.2 pCi/g).

Recognizable changes in the KUT logs occurred in this borehole. A change in apparent <sup>40</sup>K activities of about 5 pCi/g occurs at about 23 ft. This increase in <sup>40</sup>K activities probably represents the transition from the coarse-grained sediments of the Hanford H1 to the finer grained sediments of the Hanford H2.

The plots of the repeat logs demonstrate good repeatability of the SGLS data for the naturally occurring radionuclides. Man-made radionuclides were not detected in the interval from 10.0 to 25.5 ft during the original and repeat log runs.

Gross gamma profiles from Additon et al. (1978) (attached) indicate that the sediments surrounding this borehole have contained at most only minor amounts of gamma-emitting contamination. The profile from 5/24/63 may have detected gamma flux above background at about 39 ft (12 m); this gamma flux is not discernable on the 5/4/76 profile. Man-made radionuclides were not detected in this interval with the SGLS.

### **References:**

Additon, M.K., K.R. Fecht, T.L. Jones, and G.V. Last, 1978. *Scintillation Probe Profiles From 200 East Area Crib Monitoring Wells*, RHO-LD-28, Rockwell Hanford Operations, Richland, Washington.

Chamness, M.A., and J.K. Merz, 1993. *Hanford Wells*, PNNL-8800, UC-903, Pacific Northwest Laboratory, Richland, Washington.

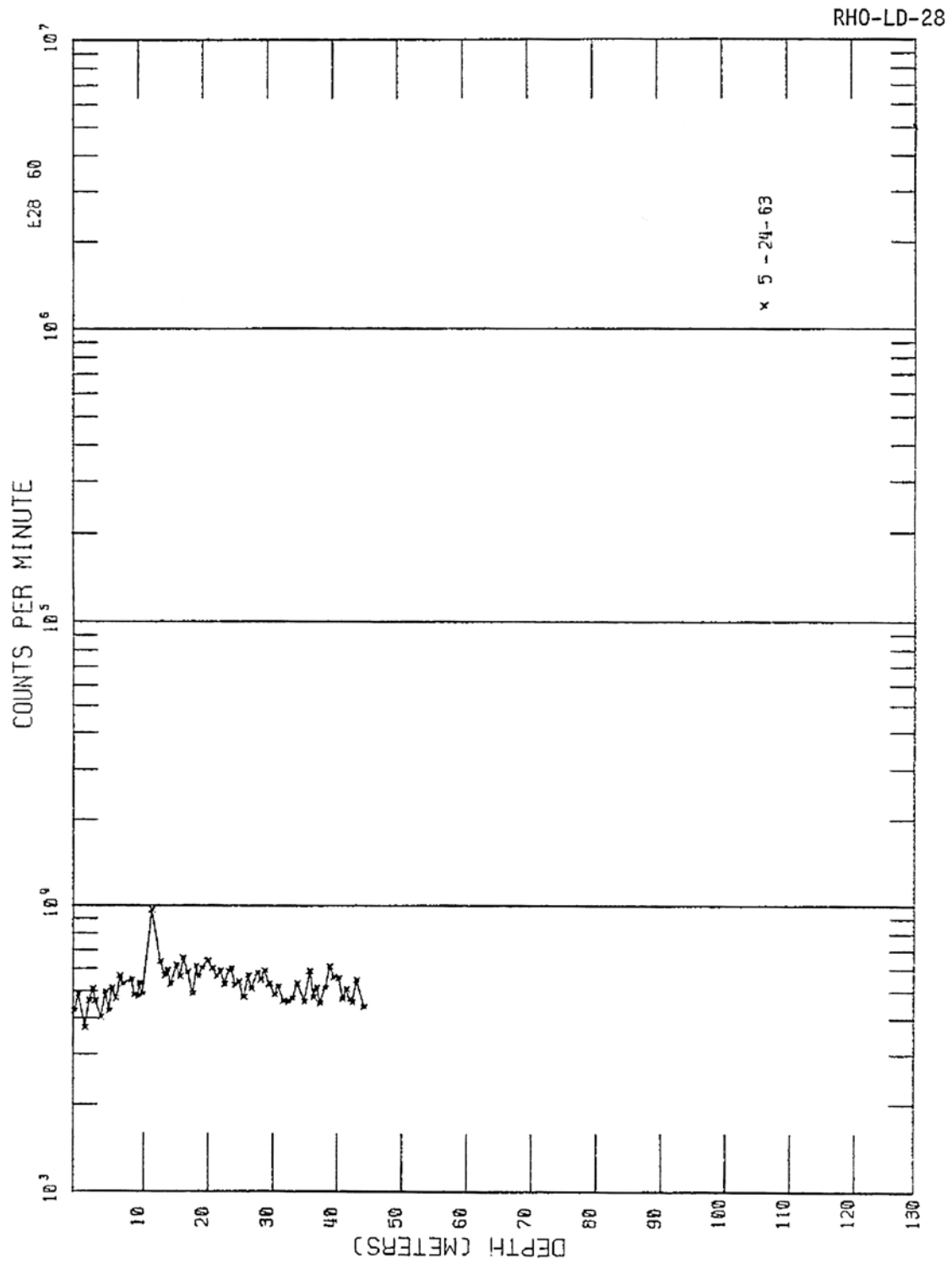
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<sup>1</sup> GWL – groundwater level

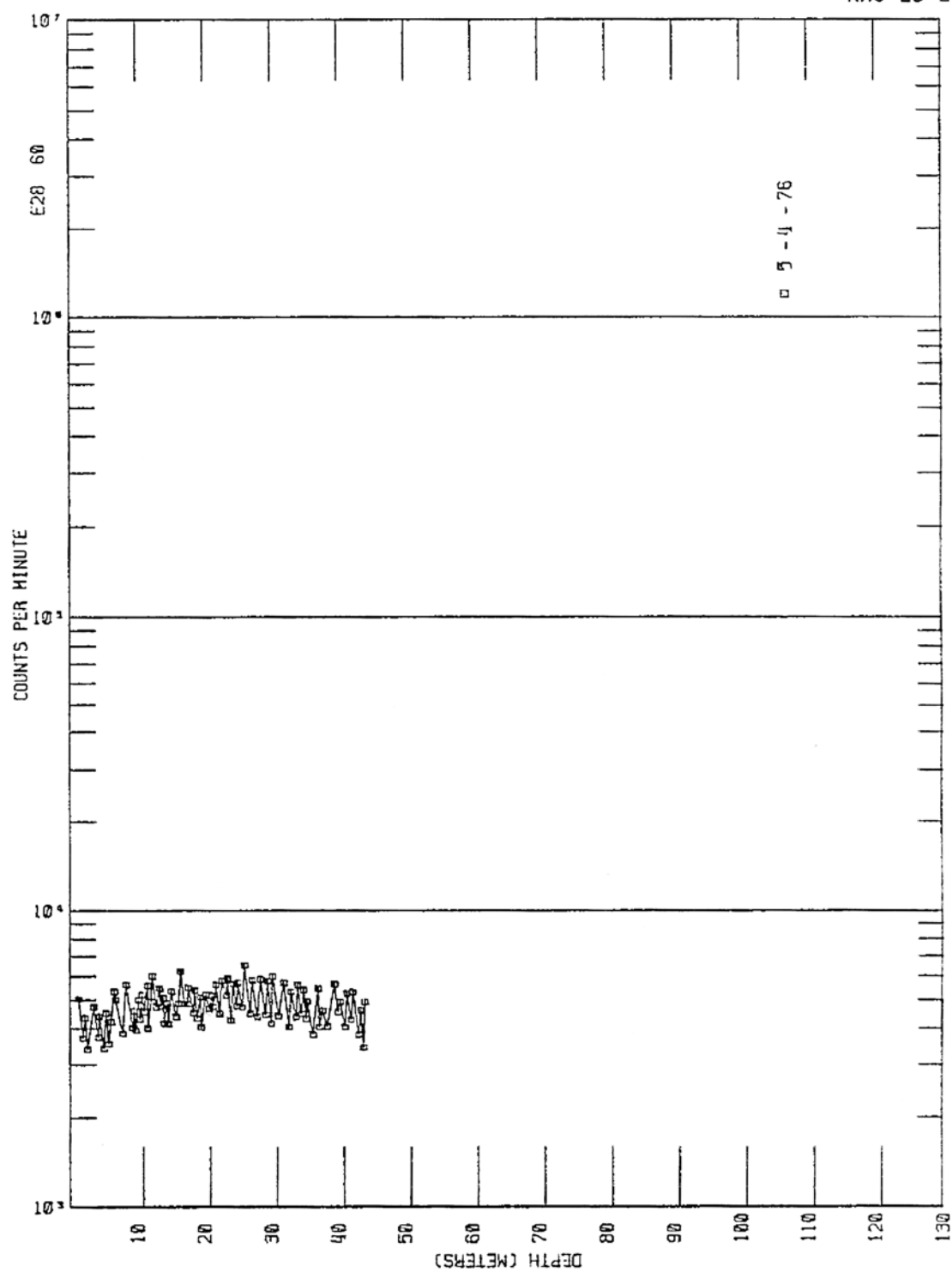
<sup>2</sup> N/A – not applicable

<sup>3</sup> TOC – top of casing

<sup>4</sup> HWIS – Hanford Well Information System



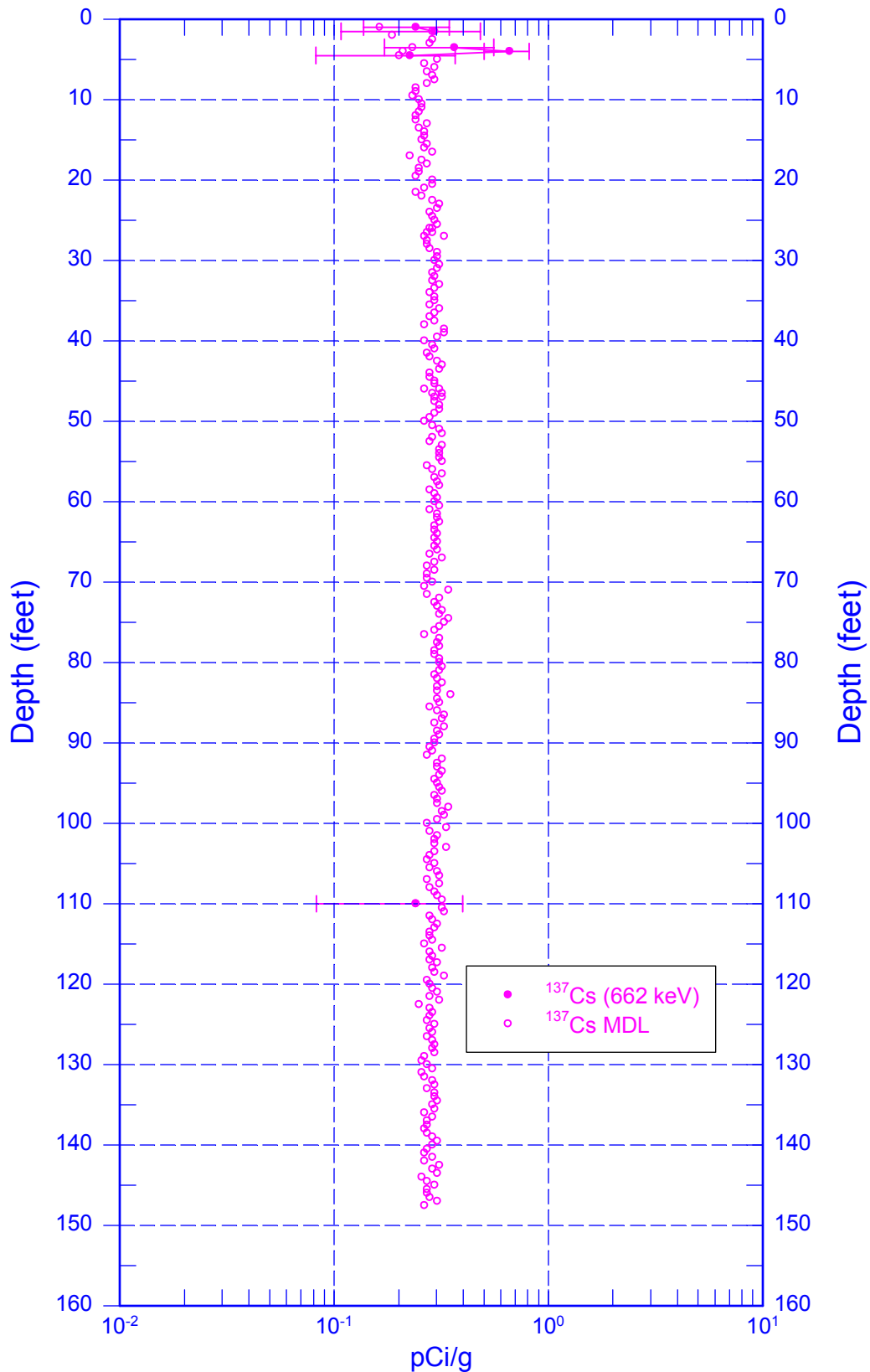
from Additon et al. (1978)



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## Man-Made Radionuclides

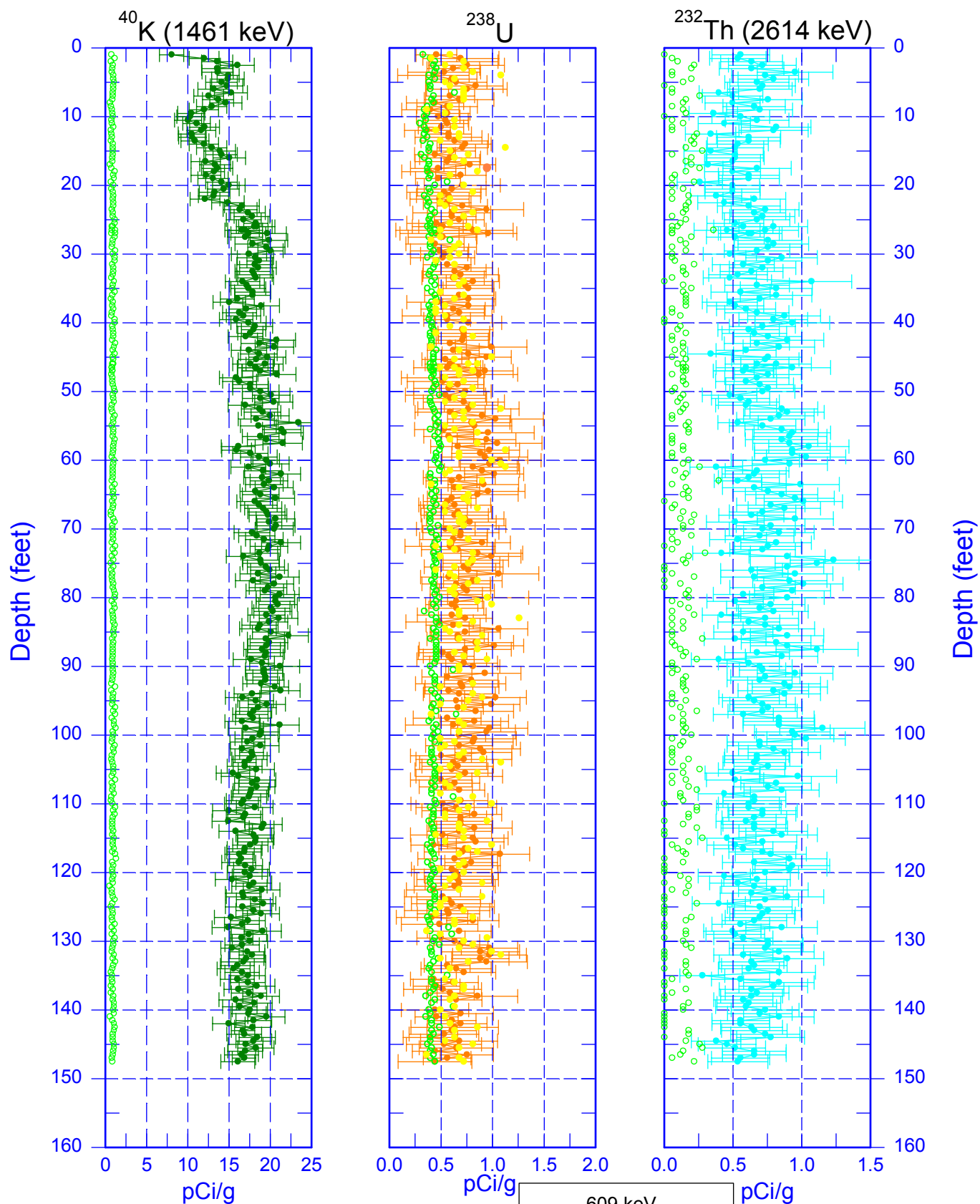


Zero Reference = Top of Casing

Date of Last Logging Run  
04/04/2002

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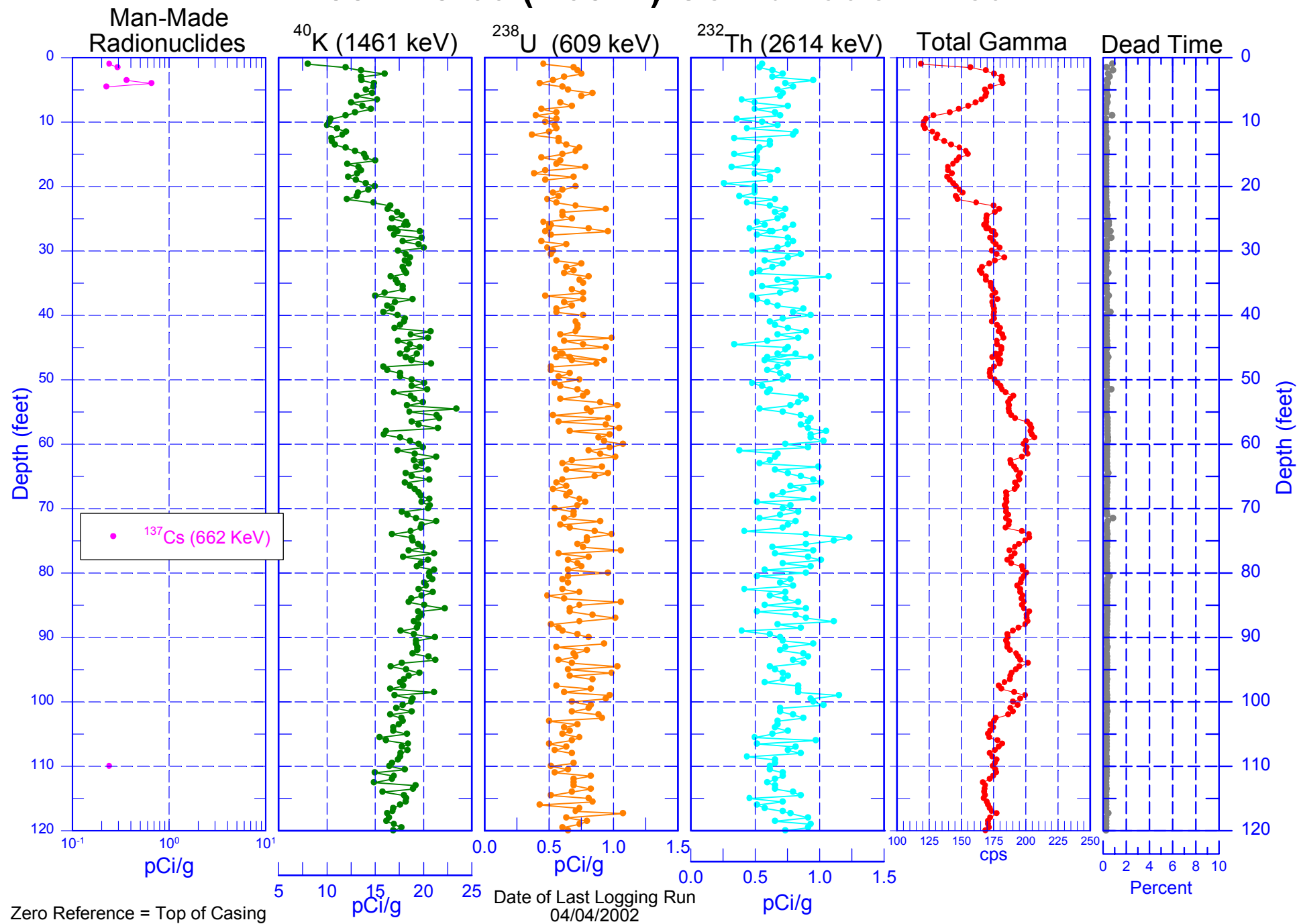
## Natural Gamma Logs



Zero Reference = Top of Casing

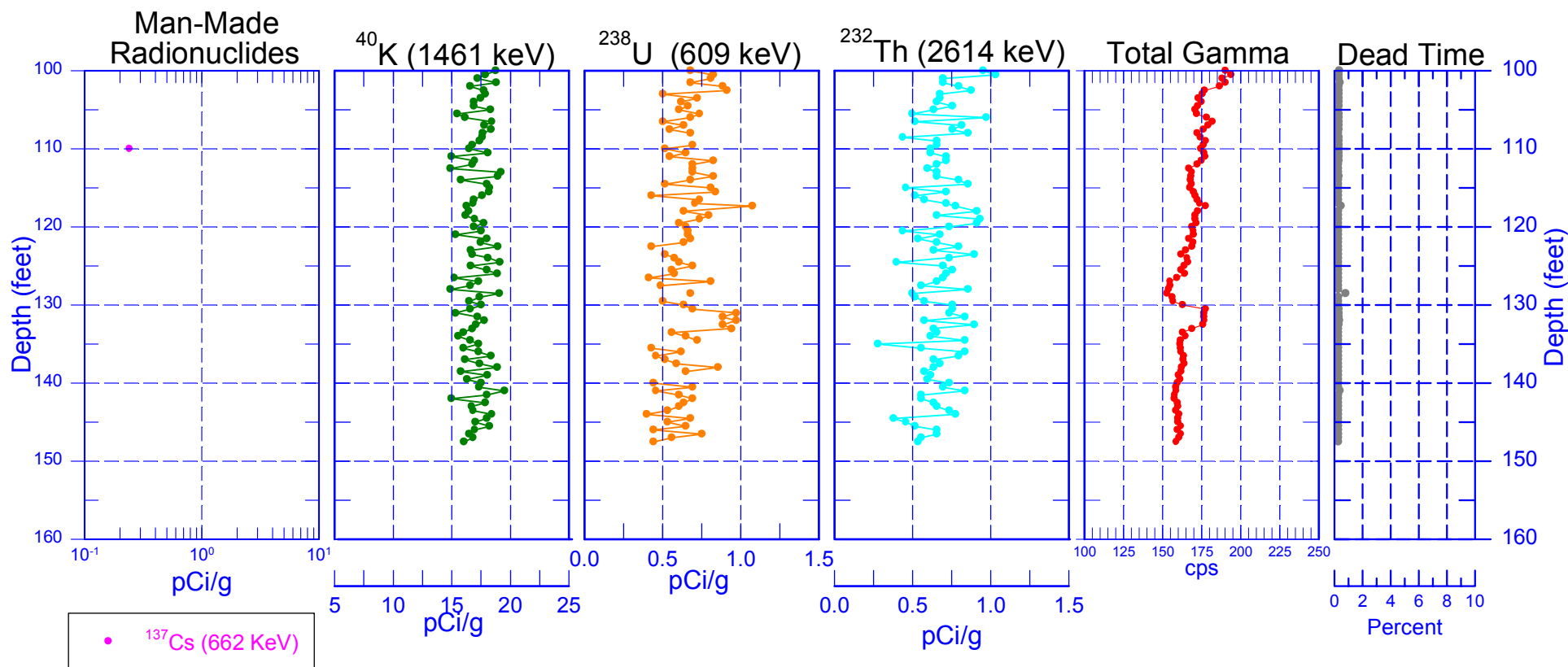
Date of Last Logging Run  
04/04/2002

# 299-E28-60 (A6811) Combination Plot





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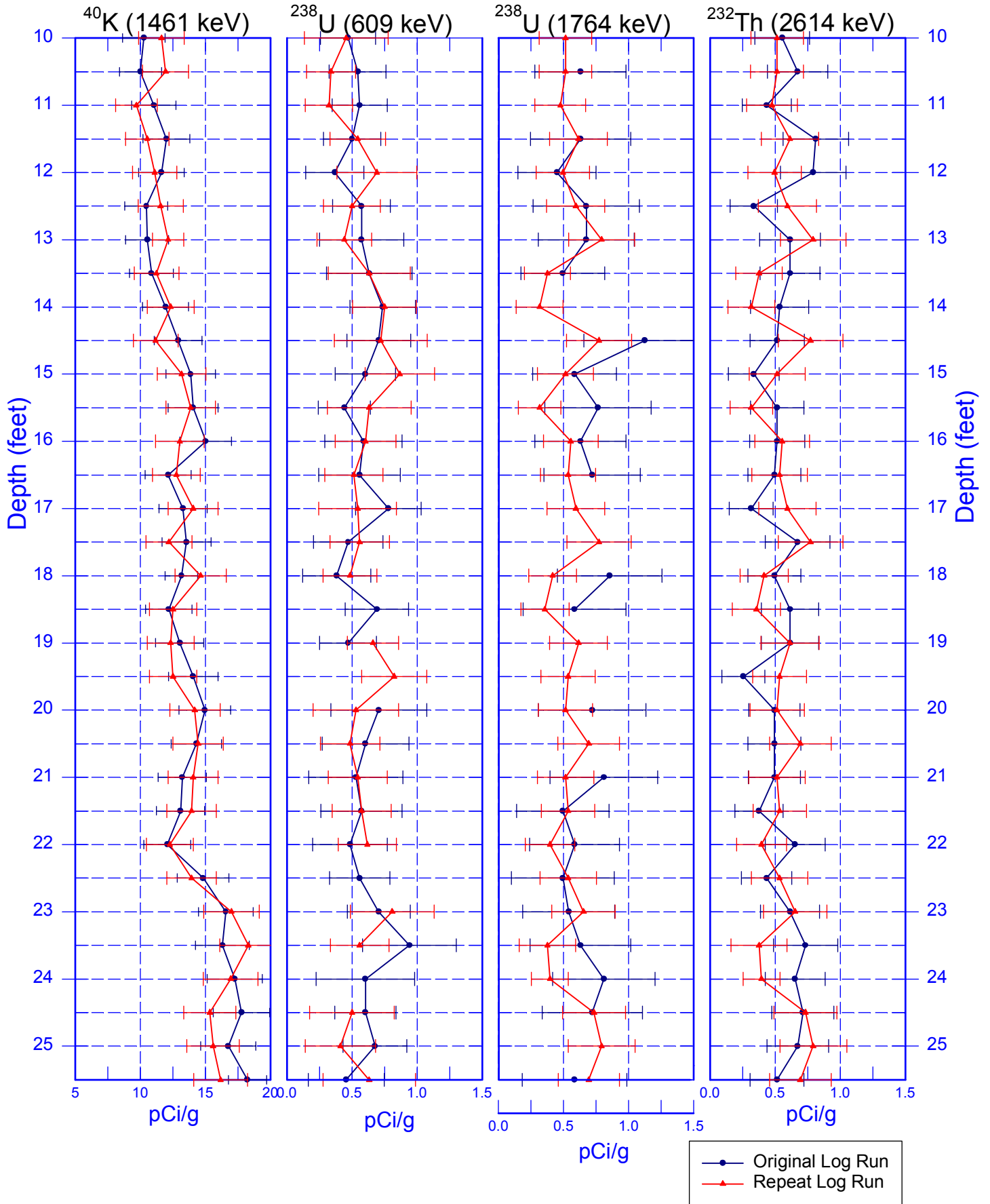


Zero Reference = Top of Casing

Date of Last Logging Run  
04/04/2002

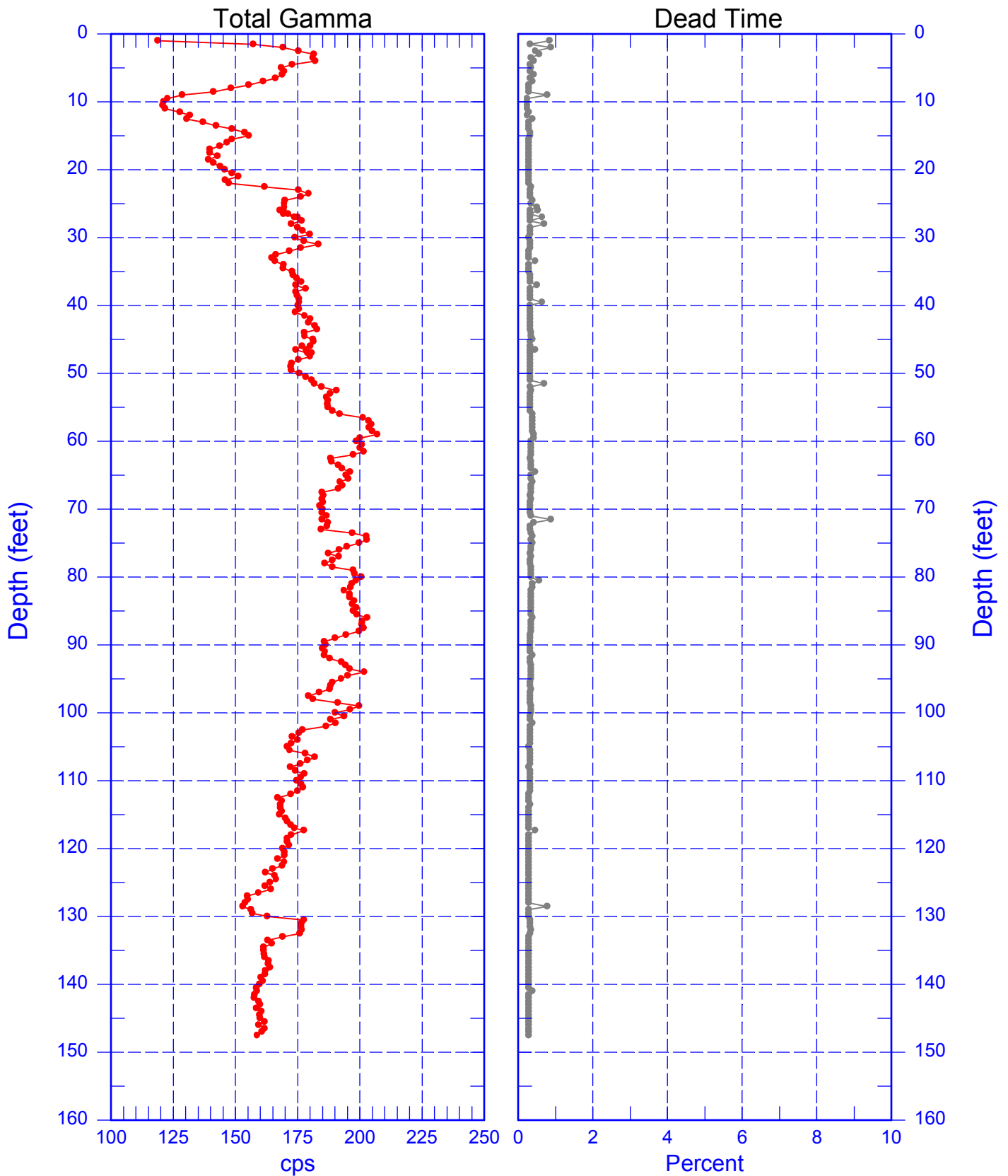
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## Rerun of Natural Gamma Logs (10 to 25.5 ft)



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## Total Gamma & Dead Time



Date of Last Logging Run  
04/04/2002

Zero Reference = Top of Casing